

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)**ScienceDirect**

Procedia - Social and Behavioral Sciences 172 (2015) 717 – 724

**Procedia**  
Social and Behavioral Sciences

Global Conference on Business & Social Science-2014, GCBSS-2014, 15th & 16th December,  
Kuala Lumpur

## A Measurement Model for Leadership Skills using Confirmatory Factor Analysis (CFA)

Rosima Alias<sup>a\*</sup>, Mohd Hanapiah Ismail<sup>b</sup>, Nurhanis Sahiddan<sup>c</sup>

<sup>a</sup> College of Graduate Studies, Universiti Tenaga Nasional, Kajang, 43000, Malaysia

<sup>b</sup> Institute of Professional Advancement, Universiti Tenaga Nasional, Kajang, 43000, Malaysia

<sup>c</sup> College of Foundation and General Studies, Universiti Tenaga Nasional, Kajang, 43000, Malaysia

---

### Abstract

The aspect of leadership is a main criterion for employers in recruiting employees. This research is to measure the validity and reliability of the instrument for measuring leadership model. The research instrument was administered to 357 respondents (pilot study). 771 respondents were then chosen at random around Klang Valley. Confirmatory Factor Analysis (CFA) was used to certify the basic factors produced by PCA using Comparative Fit Index value (CFI), Tucker Lewis Index (TLI) and RMSEA. The results demonstrate that the item corresponds and can be utilized to develop a leadership model for employers and Higher Education Institutions in the nation.

© 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of GLTR International Sdn. Berhad.

**Keywords:** Leadership Skills; Leaders; Confirmatory Factor Analysis (CFA); Principal Component Analysis (PCA); Comparative Fit Index value

---

### 1. Introduction

The aspect of leadership is an indispensable aspect for most employers both in the public sector / statutory or private sector compared to other aspects, especially in the era of globalization (Mohd Izham et al. 2007; Lee 2000; Mason 1996; Quek 1996). Without effective and efficient leadership, organizations will face failure in a short time (Sheppard, 1996) and to achieve optimal effectiveness (Robbins & Judge, 2007). The aspect of leadership is an attribute that is highly regarded in various organizations to ensure the organization is successful, to change the status quo, to create a

---

\* Corresponding author. Tel.: +603-8921-2020; fax: +603-8928-7166.

E-mail address: [rosima@uniten.edu.my](mailto:rosima@uniten.edu.my)

vision and inspire members of other organizations in order to achieve the vision (Meindl et al., 1987). Studies by Cameron and Quinn (2006) found that effective leaders are competent in managing a team and managing relationships and the development of others. Employers require prospective employees and existing employees to have the aspect of effective leadership as they indirectly have high skills in aspects of managing innovation, improvements for the future and consistent in nature (Cameron & Quinn, 2006), increase productivity, innovation, satisfaction and commitment in the workplace through the influence as a leader (Johns & Saks, 2005). Leadership can contribute to job satisfaction among employees through the creation of a conducive work environment and a positive work climate and are able to play a variety of roles to ensure excellence and effectiveness (Hussein 1993; Yahya 2005).

## **2. The Need for Leadership Development Inventory Aspects**

Leadership can be defined in various aspects. Leadership should involve others, which includes subordinates involving subordinate readiness to accept commands from the leader, thus the group helps in creating the status of a leader. Leadership in education can be defined as the ability to influence, motivate, change the attitude and behavior of subordinates such as teachers, staff and students to carry out activities or programs designated to achieve organizational goals (Yahya, 2005). The Malaysian Ministry of Higher Education (2006) defines leadership skills as involving the ability to practice its leadership in various activities. The leader is considered a hero who can be a savior and commands provider (Reeves, 2002).

Apart from the interests of the leadership skills that are very clear, as explained above, and supported by previous studies, it is one that is critical for policymakers to review what items / features that constitute a model or inventory of leadership. This is due to significant differences between the item / feature aspects of leadership within researchers from inside and outside the country. In addition, even items / attributes required by employers varies. Crosby (1979) states that leadership should take into account aspects such as listening skills, cooperation, helpfulness, distributing, creating, implementing, learning, leading directions, following and empathy and being able to communicate effectively in order to be understood and followed. Zeithaml et al. (1990) explain in the services sector, the characteristics of quality leaders are those who have the vision, high standards, leadership and involving in field work and have high integrity. Ab. Aziz (2000), states the ideal behavior of a transformational leader is (i) demonstrate exceptional competitiveness which is rarely possessed by other leaders (ii) bears responsibility among followers (iii) any organization's success is viewed as a joint with employees and the success of this celebrated formally and informally (iv) willing to accept any risk and do not blame the workers solely in the event of any failure or error (v) always strive to meet the needs of employees and even willing to set aside personal interests (vi) always dedicated to employees and co-workers on times of difficulties or critical (vii) create a sense of belonging and shared mission to achieve organizational goals.

According to Syed Azauddin (2005), leadership is the most important factor in the management system of Islam. Syed Azauddin (2005) has proposed a number of Islamic leadership, namely: (i) Have a high level of commitment, (ii) Initiate change by adding value to the organization, (iii) has a vision for the future of organization, (iv) Setting direction and knowledgeable about ways to make it happen, (v) Having emotional intelligence in recognizing the feelings and the other person for the purpose of motivation, self-manage emotions and relationships well, (vi) Have integrity and trust, (vii) a strong action-oriented value and able to carry out monitoring until a task is completed, (viii) ability to develop relationships and networks when forming a team, and (ix) Showing appreciation and has the ability to receive and are satisfied with the current achievement. There is a noticeable difference in the items in aspects of good leadership in organizations, policy makers and individuals either in contemporary concepts or concepts of Islam. By being aware of the gaps that exist, the objective of this study is to develop an inventory model of leadership according to the needs of employers and workers in organizations, as well as students and lecturers of private higher education institutions. This study will measure the reliability and validity of a new instrument for leadership model.

## **3. Methodology**

This study adopts a quantitative study conducted in two stages, a pilot study of 357 respondents and the actual study of 1040 respondents. To determine the sample size, this study has used the recommendations suggested by Halphin (1957: 2). He recommends a total of four (4) respondents, in which he suggested that the number of over 10

people will not increase the significance index score. The selection of Private Higher Education Institutions in this study was done using cluster sampling and only 11 Private Higher Education Institutions of University status were selected. The selection of students of Private Higher Education Institutions was done using stratified sampling and they were selected based on their faculty and focused on students of the third or fourth year or in their final year of study. The selection of employers and professionals from the private and public sectors is based on the division released in the Economic Report by the Economic Planning Unit and Ministry of Human Resources (2006-2007) which is based only on the services sub-sectors.

The questionnaire adopts the module by The Ministry of Higher Education (MOHE) (2006) as well as other sources. The module by MOHE (2006) was chosen because this module was built by a group of experts from Public Higher Education Institutions in the country, taking into account the needs of the job market, and was utilized by all Public Higher Education Institutions in the country. This module originally included 79 items. The construction of the questionnaire uses a five-point Likert Scale. The reliability of the research instrument can be proven by the Cronbach Alpha coefficient,  $\alpha$  which shows the value of .911. This value, according to the classification of the reliability index by Babbie (1992), is in a very high category. Due to the construction of the questionnaire which is based on a variety of sources, the method of Principal Component Analysis (PCA) was used to identify, reduce and organize a large number of questionnaire items into the leadership aspects of construct. Statistical Theory using Structural Equation Model (SEM) is the final analysis in the construction of leadership models. Confirmatory factor analysis (CFA) was conducted as a second method for determining the items in the leadership aspect of measuring and validating constructs to be measured (Schmitt, TA, 2011) and how well the constructs describe the variables in the construct. For the analysis using SEM techniques, a model is said to be acceptable or fit between the model and the data and can be received when the index showed: (1) CMIN / df with a value between 1 and 5; (2) CFI index and TLI approaching 1.00; and (3) the RMSEA index is .08 or less.

## 4. Findings

### 4.1. Exploratory Factor Analysis (Principal Component Analysis)

Factor analysis method is applied to a pilot study involving employers and professional employees of 357 people. Several conditions must be conducted prior to test whether the items are suitable in order to run the analysis. One of the tests is Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin Test (KMO).

Table 1.0 KMO Test and Bartlett's Test

Kaiser- Meyer- Olkin Measure of Sampling Adequacy		.966
Bartlett's Test of Sphericity	Approx. Chi Square	2.403E4
	df	2485
	Sig	.000

Bartlett's Test of Sphericity showed significant value of 0.000, indicating  $p < 0.05$ . Thus, it shows that the correlation between items is sufficient to run the factor analysis. In Kaiser-Meyer-Olkin Test (KMO), the value is .966 and the KMO is greater than 0.50. This shows that these items are suitable for the factor analysis performed and showed no problems of serious multicollinearity data. After Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin Test (KMO) are performed, the following Rotating Matrix Component Table is used to test the construct validity of each questionnaire constructed. From the Rotating Matrix Component Table produced, it has been able to sort the items which really measures each construct built. It is found that there were 9 dimensions that exist after Varimax rotation. Since the 9th dimension has only two items, this factor is removed. There are items that overlap or have multi-concepts, therefore ten items were eliminated, as shown in the correlation table between the items / sub-constructs with 8 dimensions / constructs which is high according to the Interpretation of Strength Correlation Between Factors

Table by Chua (2009), which shows the scale of: (i) <.01 no correlation, (ii) .01-.30 very weak, (iii) .31-.50 weak / low, (iv) .51-.70 medium, (v) .90-.71-powerful, and (vi) .91-1.00 very strong.

Table 2.0 Rotating Component Matrix Table for Testing the Construct Validity of the Questionnaire

Dimension	1	2	3	4	5	6	7	8	9
A1	.878								
A2	.870								
A3	.869								
A4	.834								
A5	.826								
A6	.757								
A7	.686								
A8	.631								
A9	.626								
A10	.608								
A11	.606								.442
A12		.750							
A13		.749							
A14		.711							
A15		.669							
A16		.624							
A17		.622							
A18		.622							
A19		.610							
A20		.600							
A21		.548							
A22		.446						.394	
A23			.736						
A24			.724						
A25			.715						
A26			.698						
A27			.687						
A28			.686						
A29			.874						
A30			.667						
A31			.459					4.22	
A32				.722					
A33				.664					
A34				.650					
A35				.643					
A36				.637					
A37				.617					
A38				.609					
A39				.588					
A40				.530					
A41				.447					
A42				.437					
A43					.754				
A44					.716				
A45					.714				
A46					.711				
A47					.710				
A48					.703				
A49					.700				
A50					.699				
A51						.680			
A52						.664			

A53						.643			
A54						.622			
A55						.581			
A56		.392				.498			
A57						.483			
A58							.655		
A59							.631		
A60							.615		
A61							.553		
A62							.542		
A63							.439		
A64								.615	
A65			.448					.546	
A66								.511	
A67			.430					.507	
A68		.407						.477	
A69				.432				.457	
A70									.785
A71									.785

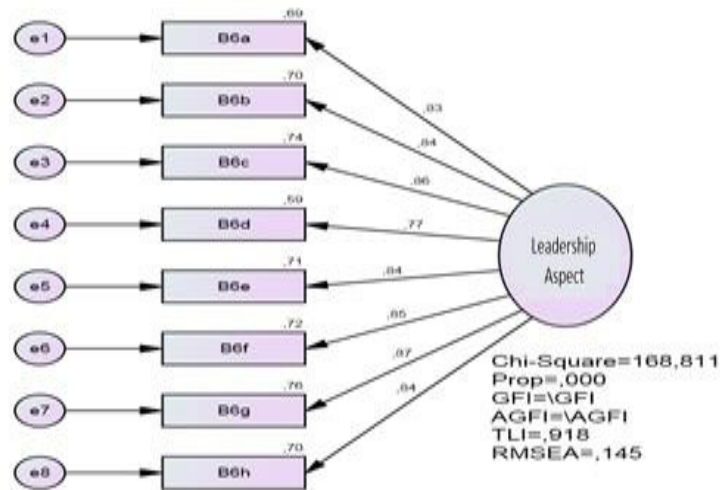
Hint: Dimension 3 is the dimension of Leadership

The results of the factor analysis through Rotated Component Matrix show that all the items' dimensions have been identified respectively showing dimension 3 is the much sought after leadership dimension. The leadership item is composed of A23: Skills to distribute tasks and responsibilities to subordinates and team members, A24: Skills to bring members to a consensus, A25: skills to influence others in carrying out their duties, A26: Skills for playing the role of team leader, A27: Skills to coach others, A28: motivating skills, A29: Skills to make appropriate decisions, and A30: Skills to lead effectively. Item A31 is removed because of overlapping with dimensions 8.

#### 4.2. Confirmatory Factor Analysis (CFA)

Structural Equation Modelling (SEM) is the final analysis for the construction of aspects of leadership. Analysis of the correspondence measurement model with the survey data was conducted using confirmatory factor analysis (CFA). CFA was utilized to determine the items in the aspect of leadership to measure the constructs of leadership and to verify the basic factors that have been produced by the PCA and to validate those constructs. Before SEM can run several specifications have to be carried out on the distribution of normality, multicollinearity, the sample size and the scale of measurement. These requirements were met in this study. Through the CFA analysis, this indicator variables represent the latent variables (aspects / leadership constructs) were proven. Testing for leadership constructs showed the Chi Square Goodness-of-Fit  $\chi^2=168.811$ , with  $p<0.05$  and the RMSEA value above is greater than .06 (<.145). This indicates significantly, the model proposed by the researchers hypothesized that the data does not match were collected. As mentioned, Chi Square is sensitive to the number of samples. The other compatible (fit) criteria / indicators can be taken into account which is TLI = .918. These criteria indicate the compatibility of more than 0.9. This shows the regression model proposed by the researchers matches the data.

Figure 1.0 Measurement Model for the Dimensions of Leadership



Due to the corresponding value such as AGFI (.000) is less than the corresponding value of (0.9), then the table of Standardized Regression Weight and Regression Weight through the Critical Ratio (C.R) is used to indicate that all variables can represent a significant indicator and predictor for latent variables as shown in Table 3.0 and Table 4.0 below.

Table 3.0 Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
B6h	<---	Leadership_Skills	1.000				
B6g	<---	Leadership_Skills	.961	.045	21.260	***	par_1
B6f	<---	Leadership_Skills	1.010	.049	20.487	***	par_2
B6e	<---	Leadership_Skills	.953	.048	19.950	***	par_3
B6d	<---	Leadership_Skills	.905	.052	17.307	***	par_4
B6c	<---	Leadership_Skills	1.005	.048	20.739	***	par_5
B6b	<---	Leadership_Skills	.987	.050	19.618	***	par_6
B6a	<---	Leadership_Skills	.996	.052	19.336	***	par_7

Table 4.0 Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
B6h	<---	Leadership_Skills	.839
B6g	<---	Leadership_Skills	.871
B6f	<---	Leadership_Skills	.850
B6e	<---	Leadership_Skills	.842

			Estimate
B6d	<---	Leadership_Skills	.767
B6c	<---	Leadership_Skills	.863
B6b	<---	Leadership_Skills	.840
B6a	<---	Leadership_Skills	.831

When using the Standardized Regression Weight and Weight Regression Table, through the Critical Ratio (C.R) it can be indicated that all variables can represent a significant indicator and predictor of the latent variables. C.R values shown are outside the range of  $\pm 1.96$  were considered significant at the level of  $p < .05$ . The standard regression coefficients ( $\beta$ ) for each item of leadership is (from .767 to .871) showing that all the indicator variables significantly correspond with the survey data or latent variables representing (aspects of leadership).

## 5. Conclusions

Through authentication and evidenced by the CFA and supported by the value of Standardized Regression Weight and Weight through the Critical Ratio (C.R), the leadership model of the study is composed of aspects of the duties and responsibilities delegated to subordinates and team members, bringing membership to a consensus, influence others on the job, playing the role of team leader, mentor others, motivate team members, making appropriate decisions, and lead effectively. Based on the highest mean found, expressing leadership aspects and playing the role of a leader to the subordinate are most needed by the employers. This is consistent with studies by Rollinson (2005) showing that the leaders have strong influence on the behavior and performance of the group.

The findings of this study can be used by policy makers, especially the ministry of education and higher education in the design and development of modules in leadership among students. These students can be known as the future "young CEOs" because individuals can be taught to be leaders, especially of a charismatic character (Stephen P. Robbins & Timothy A. Judge, 2013). In fact, organizations need to develop their leadership module for identifying potential leaders effectively. This is evidenced by most organizations which spend millions of dollars in development and leadership training (P. Dvorak, 2007). For example, Goldman Sachs is known for leadership development program, called the "Leadership factory" by Business Week (J. Weber, 2006). It is hoped that these leadership modules can be the guideline for organizations in creating effective leaders based on the items in aspects of leadership found in this study which are the requirements of employers in the country and supported by professional workers, students and lecturers of Private Higher Education Institutions.

As the result of the test Chi Square Goodness-of-Fit and significant RMSEA values suggest that the hypotheses model constructed does not match the survey data, in order to study the future, it is proposed that the analytical modification model is used to improve compatibility of the model with the research data. This is to show the leadership items being measured exists in the modification model and can measure the dimensions of leadership.

## References

- Ab. Aziz Yusof. 2000. *Pengurus Dari Gelagat Organisasi di Abad Ke 21*. Kuala Lumpur: Prentice Hall.
- Babbie, E. 1992. *Survey Research Methods* (2nd Ed.). Belmont, CA: Wadsworth.
- Cameron, K.S., & Quinn, R.E. 2006. *Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework*. San Francisco: Jossey Bass Inc.
- Chua, Y. P. 2009. *Statistik Penyelidikan Lanjutan: Ujian Regresi, Analisis Faktor dan Analisis SEM*. McGraw-Hill (Malaysia) Sdn Bhd.
- Crosby, P.B. 1979. *Quality is Free: The Art of Making Quality Certain*. New York: new American Library.
- Halphin, A.W. 1957. *Manual for the Behavior Description Questionnaire*. Columbus Ohio: The Ohio State University.
- J. Weber. 2006. "The Leadership Factors," *Business Week*, June 12, pp. 60-64.
- John, G. & Saks, A.M. 2005. *Organizational Behavior: Understanding and Managing Life at Works*. Ed. Ke-6. Toronto: Prentice Hall.

- Kementerian Pengajian Tinggi.2006. Modul Pembangunan Kemahiran Insaniah (soft skills) untuk Institut Pengajian Tinggi Malaysia. Serdang: UPM.
- Kline, R.B. 1998. Principles and Practice of Structural Equation Modeling. NY: Guilford Press.
- Laporan Ekonomi Unit Perancang Ekonomi dan Kementerian Sumber Manusia (2006-2007).
- Lee, S. K. V. 2000, ‘The Demand for Business and Management Education in Hong Kong Beyond 1997’, in Rowley, C., Fitzgerald, R. (Eds), *Managed in Hong Kong: Adaptive Systems, Entrepreneurship and Human Resource*, Frank Cass, London.
- Mason, G., Williams, G., & Cranmer, S. 2006. Employability Skills Initiatives in Higher Education: What Effects do they have on Graduate Labor Market Outcomes? National Institute of Economic and Social Research.
- Meindl, J.R., Ehlich, S.R. & Dukerich, J.M. 1987. The Romance of Leadership and the Evaluation of Organizational Performance. *Academy Of Management Review* 12 (1): 91-109.
- Mohd Izham Mohd Hamzah, Roselena Mansor & Zullaili Hussein. 2007. Modal Insan Berkualiti: Adakah Kemahiran Insaniah Penyelesaiannya? Seminar Kebangsaan Isu-Isu Pendidikan Negara Ketiga. Dasar dan Perlaksanaan Ke arah Pengukuhan Hala Tuju Dasar Pendidikan Negara, Universiti Kebangsaan Malaysia.
- P. Dvorak. 2007. M.B.A. Programs Hone Soft Skills, ” *The Wall Street Journal* , p.B3
- Quek, A. H. 1996a, *World culture and values: a process perspective*, paper presented at the Seminar on European Business, Baden-Wurttemberg, October,.
- Reeves, R. 2002. Reality bites. *Management Today*. September, 35.
- Robbins, S.P., & Judge, T.A. 2007. *Organizational Behavior*. Ed. Ke-12. New Jersey: Pearson Education Inc.
- Rollinson, D. 2005. *Organizational Behavior and Analysis: An Integrated Approach*. Ed. Ke-3. England: Pearson Education. Limited.
- Schmitt, T.A., 2011. Current Methodological Considerations in Exploratory and Confirmatory Factor Analysis. *Journal of Psychoeducational Assessment*. 29(4):304-321.
- Sheppard, B. 1996. Exploring the Transformational Nature of Instructional Leadership. *Alberta Journal of Educational Research*, 42, 325-344.
- Stephen P. Robbins & Timothy A. Judge. 2013. *Organizational Behavior*. 5th Ed. England: Pearson Education Limited.
- Syed Azauddin Syed Bahaldin. 2005. *Alternative Quality Management Standards-Islamic Perspective*. Kuala Lumpur: Utusan Publications and Distributors Sdn.Bhd.
- Yahya Don. 2005. *Kepimpinan Pendidikan di Malaysia*. Gombak: PTS Profesional.
- Zeithaml, Parasuraman & Berry.1990. *Delivering Quality Service*. New York: Macmillan Publisher.